

IN THE APPLICATION
OF
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FOR A
PALLET CONSTRUCTED OF RUBBER COMPOSITE

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BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

5 The present invention relates to pallets for storing and transporting goods, and more particularly, to a pallet constructed of a rubber composite.

2. DESCRIPTION OF THE RELATED ART

10 The use of pallets for storing and transporting products is well known in the arts. Pallets are rectangular raised platforms adapted for movement by forklifts. Traditionally, pallets have been constructed of wood, each with an upper face and a lower face separated by two or more crossbeams to enable the tines of a forklift to be inserted between the faces. Typically, the cost of a pallet constructed of wood is between
15 ten and fifteen dollars.

Over the last several years, the use of wood packaging for foreign shipments has received much international attention due to the possible spread of pests and diseases. As a result, the European Union and other NAFTA countries are moving toward the adoption of the International Plant Protection Convention

(IPPC), which sets forth standards for treating wood packaging. Significantly, the IPPC requires that wooden pallets used for international shipments be treated, i.e., fumigated.

5 Because treating wooden pallets has several drawbacks, transporters and pallet manufacturers have considered using pallets constructed of plastic. However, although plastic pallets do not need to be treated for pests and diseases, they are more expensive to produce than wooden pallets. Typically, the cost of a plastic pallet is between eighty and eighty-five
10 dollars, which is more than five times the cost of producing a wooden pallet.

Consequently, a non-wooden pallet with a lower production cost is desired. Such a pallet would need to be produced from a material that is less expensive than plastic, such as rubber.
15 The cost of rubber is between five and twenty percent of the cost of plastic, and the cost of producing a pallet constructed of hard rubber is estimated to cost between twenty and thirty dollars at the current market price of rubber.

Examples of patents for plastic pallets are provided by
20 U.S. Patent No. 5,579,686, issued December 3, 1996 to B.L. Pigott et al. (plastic pallet assembly); U.S. Patent No. 5,887,529, issued March 30, 1999 to M. John et al. (modular

pallet with interlocking inserts); U.S. Patent No. 6,029,583, issued February 29, 2000 to S.F. LeTrudet (pallet with attachable upper and lower members); U.S. Patent No. 6,109,190, issued August 29, 2000 to R.G. Hale et al. (materials handling pallet); U.S. Patent No. 6,199,487, issued March 13, 2001 to L. Coddington (modular pallet structure) and U.S. Patent No. 6,216,608, issued April 17, 2001 to M.E. Woods et al. (plastic pallet). However, none of these teach a non-wooden pallet constructed of a low cost material, such as rubber.

Accordingly, none of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed. Thus a pallet constructed of a rubber composite solving the aforementioned problems is desired.

SUMMARY OF THE INVENTION

The present invention is a pallet constructed of a rubber composite that includes recycled rubber, natural rubber, sulfur and a filler material. The pallet has an upper member and a lower member that interconnect to resemble a traditional American model wooden pallet. Although an assembly of just two molded components, the pallet of the present invention has the appearance of being constructed of a number of planks attached

to two or more crossbeams. In an alternative embodiment, the pallet of the present invention resembles a European model wooden pallet by appearing to be constructed of a number of planks attached to two grids, each of which is attached to opposite surfaces of nine support blocks.

Accordingly, it is a principal object of the invention to provide a pallet constructed of a rubber composite.

It is another object of the invention to provide a pallet that does not require fumigation or other treatment prior to foreign shipment and is less expensive to produce than plastic pallets.

It is a further object of the invention to provide a pallet that resembles a wooden pallet but is constructed of materials other than wood.

Still another object of the invention is to provide a pallet constructed of a rubber composite that is shaped and dimensioned to work with existing automated loading and shipping equipment.

Yet another object of the invention is to provide a pallet that is free of mold, sawdust and insects, and that does not warp or readily burn.

It is an object of the invention to provide a pallet that is constructed in part from recycled materials.

It is an object of the invention to provide improved elements and arrangements thereof for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a pallet constructed of rubber composite according to the present invention.

Fig. 2 is an exploded view of the pallet of Fig. 1.

Fig. 3 is a front view of a pallet constructed of rubber composite according to the present invention.

Fig. 4 is a side view of a pallet constructed of rubber composite according to the present invention.

Fig. 5 is a section view drawn along lines 5-5 of Fig. 4.

Fig. 6 is a perspective view of an alternative embodiment of a pallet constructed of rubber composite according to the present invention.

Fig. 7 is an exploded view of the pallet of Fig. 6.

Fig. 8 is a perspective view of a second alternative embodiment of a pallet constructed of rubber composite according to the present invention.

5 Fig. 9 is a perspective view of a third alternative embodiment of a pallet constructed of rubber composite according to the present invention.

Fig. 10A is a fragmented view of an upper member of a pallet according to the present invention showing a notch.

10 Fig. 10B is a fragmented view of a lower member of a pallet according to the present invention showing a holding wedge.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 The present invention is a pallet constructed of rubber composite designated generally as 10 in the drawings. In appearance, it resembles a traditional American model wooden pallet as shown in Fig. 1. It is assembled from two injection-molded components including an upper member 30 and a lower
20 member 50, as shown in Fig. 2.

The upper member 30 is molded such that it has a number of planks 32 attached to three crossbeams 34. The crossbeams 34, also known as stringers among pallet manufacturers, are substantially the same length, are substantially parallel to each other, and run front-to-back across the pallet 10. Likewise, the planks 32 are substantially the same length, are substantially parallel to each other, and run side-to-side across the pallet 10. The bottom side of each plank 32 is attached to the top edge of each of the crossbeams 34 with each plank 32 oriented substantially perpendicular to each crossbeam 34.

Similarly, the lower member 50 is also molded such that it has a number of planks 52 attached to three crossbeams 54. The crossbeams 54 are substantially the same length, are substantially parallel to each other, and run front-to-back across the pallet 10. The planks 52 are substantially the same length, are substantially parallel to each other, and run side-to-side across the pallet 10. The bottom edge of each of the crossbeams 54 is attached to the top of each plank 52 with each plank 52 being oriented substantially perpendicular to each crossbeam 54.

Each of the crossbeams 54 in the lower member 50 has three holding wedges 56 protruding from one of its sides, and each of the crossbeams 34 in the upper member has three corresponding notches 36 (see Fig. 10A and 10B) in one of its sides. Each holding wedge 56 is triangular in section with a horizontal base 62, a side adjoined to the crossbeam and a side 64 that slopes downward away from the crossbeam. The surfaces of the base 62 and the sloped side 64 are rectangular. Each notch 36 is a recessed square sized to accommodate a holding wedge 56.

When the upper member 30 is lowered onto the lower member 50 with corresponding crossbeams 34 and 54 aligned, each holding wedge 56 snap-fits into a mating notch 36. Once snapped into notches 36, the holding wedges 56 prevent the two members 30 and 50 from being separated and also prevent any relative front-to-back lateral movement between the members 30 and 50.

Each crossbeam 34 and 54 has two arches, a front arch 70 and a rear arch 72, extending upward from its bottom surface, as shown in Figs. 2 and 4. The front arches 70 are positioned such that they all align when the upper 30 and lower members 50 are assembled. Likewise, the rear arches 72 also align when the members 30 and 50 are assembled. The arches 70 and 72 allow the pallet 10 to be lifted by a forklift from either of its sides,

as an alternative to being lifted from the front or back of the pallet.

Fig. 3 shows a front view of the pallet 10 with the two outer crossbeams 34 extending downward from the upper member 30, and with two crossbeams 54 extending upward from the lower member 50 and fitting snugly against the inner face of the outer crossbeams 34 such that the crossbeams 34 and 54 prevent any side-to-side lateral movement between the upper 30 and lower members 50. Fig. 5 shows a cross section of the pallet 10. A holding wedge 56 on each of the lower member crossbeams 54 is engaged in a corresponding notch 36 on an upper member crossbeam 34, such that the upper and lower members 30 and 50 cannot be separated or moved laterally relative to each other.

Fig. 8 shows a slight variation of the pallet, designated 200 in Fig. 8, having injection molded upper 230 and lower 250 members joined together in which the planks 232 of the upper member 230 extend slightly beyond the rectangular boundary formed by the crossbeams 234 and 254 to form an overhang 238. The overhang 238 facilitates shrink-wrapping the pallet 200 and its load.

Fig. 9 shows another variation of the pallet, designated 300, having injection molded upper 330 and lower 350 members in

which a retaining wall 302 extends upward from the periphery of the upper member 330. The retaining wall 302 helps prevent shifting loads from falling off of the pallet 300.

5 Figs. 6 and 7 depict an embodiment of a pallet of the invention designated as 100 that resembles a European model wooden pallet. This pallet 100 is also an assembly of an upper member 130 and a lower member 150.

10 The upper member 130 is molded such that it has a number of planks 132 attached to the top of a grid 134, with the underside of the grid 134 attached to the tops of a plurality of support blocks 136. The planks 132 are substantially the same length, substantially parallel to each other and run side-to-side across the pallet 100. The grid 134 is substantially flat, being formed with three planks running side-to-side and three planks running front-to-back. The support blocks 136 are all substantially the same length and substantially parallel to each other.

20 Similarly, the lower member 150 is also molded such that it has a number of planks 152 attached to the bottom of a grid 154, with the top of the grid 154 attached to the bottoms of nine support blocks 156. The planks 152 are substantially the same length, substantially parallel to each other and run side-to-

side across the pallet 100. The grid 154 is substantially flat, being formed with three planks running side-to-side and three planks running front-to-back. The nine support blocks 156 are all substantially the same length and substantially parallel to each other.

Each of the support blocks 156 in the lower member 150 has a holding wedge 158 protruding from one of its sides, and each of the support blocks 136 in the upper member has a corresponding notch in one of its sides, similar to the notch 36 shown in Fig. 10A. Each holding wedge 158 is triangular with a horizontal base, a side adjoined to the support block 156 and a side that slopes downward away from the support block 156. The surfaces of the base and the sloped side are rectangular. Each notch is a recessed square sized to accommodate a holding wedge 158.

When the upper member 130 is lowered onto the lower member 150 with the peripheral edges of each member aligned, each holding wedge 158 snap-fits into a mating notch. Once snapped into the notches, the holding wedges 158 prevent the two members 130 and 150 from being separated and also prevent front-to-back lateral movement between the members 130 and 150. Because all of the outer support blocks 136 extend from the upper member

130, and because support blocks 156 extending from the lower member 150 fit snugly against them 136, the support blocks 136 and 156 prevent side-to-side lateral movement between the upper 130 and lower members 150. The pallet 100 can also be formed with an overhang to facilitate shrink-wrapping or a retaining wall to help prevent shifting loads from falling off of the pallet.

All of the above embodiments are formed via injection molding using a rubber composite that includes recycled rubber, natural rubber, sulfur and a filler. A forty-five pound pallet is formed from a composite with about twenty pounds of recycled rubber, between about ten and fifteen pounds of natural rubber, about five pounds of sulfur and one or more fillers, such as plastic or coal ash.

It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.